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LEXSEE 221 U.S.P.Q. (BNA) 385

RCA CORP., Appellant, v. APPLIED DIGITAL DATA SYSTEMS, INC.,
HAZELTINE CORP., and LEAR SIEGLER, INC., Appellees; LEAR SIEGLER,
INC., Appellee/Cross-Appellant, v. RCA CORP., Appellant/Cross-Appellee

Appeal Nos. 83-782, 83-827

UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT

730 F.2d 1440; 1984 U.S. App. LEXIS 14873; 221 U.S.P.Q. (BNA) 385

March 20, 1984

PRIOR HISTORY: [1]**

Appealed from: U.S. District Court of Delaware

DISPOSITION:

Appeal No. 83-782: REVERSED-IN-PART,
AFFIRMED-IN-PART, AND REMANDED

Appeal No. 83-827: DISMISSED AS MOOT

LexisNexis(R) Headnotes

COUNSEL:

William J. Gilbreth, of New York, New York, argued for Appellant.

John Farley, of New York, New York, was on the brief for appellant RCA Corporation. Also on the brief was A. Russinoff.

Dana M. Raymond, of New York, New York, argued for appellee Hazeltine Corporation. With him on the brief were James J. Maune.

Charles W. Bradley, of New York, New York, argued, for appellee Applied Digital Data System. With him on the brief were Steven D. Glazer and J. T. Caverder.

Edwin L. Hartz, of Pasadena, California, argued for appellee Lear Siegler, Inc. With him on the brief was Stephen D. Natcher and Leo J. Young.

John E. Kidd, of New York, New York, and Keith E. Mullenger, J. David Ellett, Jr., Stephen J. Harbulak, Michael J. Cronin and Paul W. Hemminger were on the brief for Amicus Curiae, International Telephone and Telegraph Corporation.

JUDGES:

Markey, Chief Judge, Kashiwa, and Nies, Circuit Judges. Kashiwa, Circuit Judge, dissenting.

OPINIONBY:

NIES

OPINION:

[*1442] NIES, Circuit Judge.

Appeal No. 83-782 [*2] is from the final judgment of the United States District Court for the District of Delaware (Stapleton, J.) holding U.S. Patent No. 3,345,458 to Cole et al. (the "Cole" patent) invalid as anticipated under 35 U.S.C. § 102. n1

n1 Reported at 558 F. Supp. 937, 217 USPQ 421 (D.Del. 1983).

Appellant RCA Corp., the owner of the subject patent, sued its former licensees, Hazeltine Corp. and Applied Digital Data Systems, Inc., for patent infringement. Lear Siegler, Inc., filed a declaratory judgment action in California to have the Cole patent declared invalid. The California suit was consolidated with proceedings before the Delaware court. These parties are collectively identified as HLA in this opinion.

The principal issue in Appeal No. 83-782 is whether the district court correctly found that claims 1, 2, and 3 of RCA's patent, covering a digital video character generator, are anticipated by the disclosure in the "Dirks" patents. We reverse the holding of invalidity in view of Dirks alone.

HLA asserts [**3] that the district court erred in failing to hold the Cole claims invalid for obviousness

under 35 U.S.C. § 103 in view of a number of prior art references. We affirm the district court's holding that these references would not have rendered the subject invention obvious. The case is remanded for consideration, if appropriate, of the counts which were not tried.

Appeal No. 83-827, in which Lear Siegler seeks reversal of the part of the judgment denying it a refund of royalties, is dismissed as moot.

Our jurisdiction over these appeals is provided by 28 U.S.C. § 1295(a)(1).

I

The Cole patent discloses a system for decoding digital symbol codes representing a message and converting them into video control signals for display of the message on a television screen.

A picture is ordinarily formed on a television set by an electron beam which illuminates various points on the screen or cathode ray tube (CRT) of the television as it scans across the screen. The beam scans one horizontal line at a time, starting with the line at the top of the screen and moving sequentially down the screen. This pattern of scan is referred to as a television raster scan. By means of a digital [**4] video signal to appropriately control the points at which the beam illuminates the screen during its scan, the beam can be used to form a message or image. Since the beam traverses the entire screen in a fraction of a second (the "refresh" rate), the movement of the beam is not noticeable.

The district court opinion sets out in detail a description of the Cole patent specification and the pertinent prior art devices and should be consulted for a thorough discourse on the technology involved.

The Cole device is designed to operate with a standard television monitor. In Cole, each character is formed slice by slice, in a character space on the screen consisting of a matrix of dots. Since a number of characters are represented across the screen, the beam traces the top slice of each of the characters in a row of character spaces as it traverses the initial scan line, then proceeds to trace the second slice of each of the characters in the next scan line, and so on.

As the beam tracing the television raster moves across the screen in a scan line, the binary codes for each of the characters to [*1443] be written in a row across the screen are sequentially provided to a "digital-to-video" [**5] generator. Vertical and horizontal synch pulses from a television synch generator are used to drive the television monitor and to provide the digital-to-video generator with information identifying the scan line (vertical) position of the beam and the instantaneous dot (horizontal) position of the beam on that line. Based on

this information, the digital-to-video generator decodes the binary character codes into a character pattern of 1's and 0's which, when applied to the television monitor, are transformed to a display of "on" and "off" dots, respectively. This direct translation of character codes into television video display signals, without any intermediate storage, is commonly referred to as "real time" or "on the fly" operation.

Claims 1 through 3 of the Cole patent, the claims in suit, are reproduced below:

1. A display system for generating character patterns for display on a display device that exhibits a television raster-scan pattern, each character pattern being displayed in one character space,

means responsive to a certain character code for applying to a certain selected lead an output signal having a duration substantially equal to the scanning time in [**6] said scan-line direction through one character space,

means for generating scan-line select counts in synchronism with the scan-lines of said raster, each scan-line count having a duration substantially equal to that of a raster scan-line,

means for generating position counts which occur successively during a scan along a scan-line through a character space, and means for causing said output signal appearing on said selected lead, said scan-line counts and said position counts to supply to said display device a selected character pattern.

2. In a system for displaying a message comprising certain character patterns on a display device that exhibits a raster scan-line pattern, wherein each different character pattern is manifested by a digitally coded data signal corresponding thereto, the improvement comprising generating means responsive to the data signal forming said message applied thereto for digitally generating a video signal for use in displaying said message on said display device, and means for applying said data signals forming said message to said generating means.

3. The improvement defined in claim [2], wherein said generating means includes [**7] first means for producing as said video signal a signal which selec-

tively has either a first level or a second level for the entire duration of each respective one of successive elemental time intervals all of which have the same predetermined duration, the duration of each television raster scan line being an integral multiple of said predetermined duration, and second means coupled to said first means for selecting which of said first and second levels, respectively, exists during each respective one of said successive elemental time intervals in accordance with the data signals forming said message.

The emphasized portions are the key to our decision.

II

As an initial matter, we note that it is incumbent on a district court to indicate on whom the burden of persuasion was placed and what quantum of proof was required to establish disputed facts. An error in either respect may require reversal. In this case, the answers to these questions are difficult to discern. Clearly, however, an error of law was made in one important aspect of this matter. The statutory presumption of validity imposes the burden of persuasion on one who attacks the validity of a patent. 35 [**8] U.S.C. § 282. In this case the district court applied the view of some circuits that, where art more relevant than that considered by the examiner is made of record, the presumption of validity is destroyed. This court has squarely rejected that view. *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1566, [*1444] 220 USPQ 97, 100 (Fed. Cir. 1983); *SSIH Equipment S.A. v. U.S. Int'l Trade Com'n*, 718 F.2d 365, 375, 218 USPQ 678, 687 (Fed. Cir. 1983).

Attention is directed to the recent opinion of Judge Rich in *American Hoist & Derrick Co. v. Sowa & Sons*, 725 F.2d 1350, slip op. at 12-16 (Fed. Cir. 1984), for a comprehensive discussion of the statutory presumption and its effect. In sum, the position of this court is that the burden of persuasion on invalidity must, under the statute, remain at all times on the party asserting invalidity, although that burden may be carried more easily by evidence consisting of more pertinent prior art than that considered by the examiner. *Id.* Further, the facts establishing anticipation and/or obviousness must be proven by clear and convincing evidence. *Railroad Dynamics, Inc. v. A. Stucki Co.*, 727 F.2d 1506, [**9] slip op. at 23-24 (Fed. Cir. 1984).

III

Anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 772, 218 USPQ 781, 789 (Fed. Cir. 1983). Furthermore, with an element expressed in terms of a means plus function, "absent structure [in a prior art reference] which is capable of performing the functional limitation of the 'means,' [the prior art reference] does not meet the claim." *In re Mott*, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977).

The district court found that the Cole claims in suit read on a system disclosed in German, French, and British patents issued to Dirks between 1948 and 1957, none of which were considered by the examiner during the prosecution of the Cole patent application. The district court agreed with HLA's assertion that "The Dirks system . . . is the Cole system implemented in 1940's technology, and, since the Cole claims are drawn to cover all digital systems generically, as opposed to a new implementation, they are anticipated by [the] foreign Dirks' patents."

The Dirks patents [**10] disclose a video display system in which character codes, stored on a rotating magnetic medium, are repeatedly translated upon repeated rotations of the magnetic medium. During the first revolution, the stored character codes are successively translated to form the video pulse train for the first slice of each character on a character row. On the second revolution, the second slice of each character is translated, and so on. The Dirks system includes drive circuitry that causes the CRT beam to scan across and down the screen in a TV raster scan pattern in synchronism with the translation of the character codes. n2

n2 The disclosure of this circuitry in Dirks is sketchy at best. RCA points to its unequivocal and detailed expert's testimony that Dirks is inoperable, and to the failure of HLA to adequately counter this evidence. In view of our disposition of the case on other grounds, it is unnecessary to decide this issue raised again on appeal. We assume Dirks is operable.

The digital-to-video translator [**11] of Dirks includes pre-wired core matrices for each character to be represented, a stepping switch which moves from position to position in accordance with the scan line that the CRT beam is traversing, and magnetic yokes which move in unison across each of their respective matrices, the position of the yokes corresponding to the dot position of the beam as the drive circuitry causes the beam to scan across a character space.

In an appendix to the district court opinion, each of the Cole claims is set out with a disclosure from the Dirks British patent indicated as corresponding thereto. n3 Without any analysis in its opinion, [*1445] the district court found that "while the implementation of the system is quite different in Dirks than in Cole, a comparison of the Cole claims with the Dirks disclosure reveals that the former describes the latter precisely." This finding is clearly erroneous.

n3 We note that the appendix is taken from HLA's post-trial brief. During the trial, no testimony or other evidence was presented by HLA showing how each element of the claims could be read on the Dirks reference. It appears that the court placed the burden on RCA to establish the validity of its claims over Dirks (since Dirks had not been considered by the PTO), rather than on HLA to prove by clear and convincing evidence that each element of the claim was anticipated by the reference. Because of the statutory presumption, a court is required to assume novelty and then "must be satisfied . . . that the party challenging validity has carried its burden of overcoming the presumption." *Medtronic, Inc. v. Cardiac Pacemakers, Inc.*, 721 F.2d 1563, 1567, 220 USPQ 97, 100 (Fed. Cir. 1983).

[**12]

Claim 1 of the Cole invention contains four means-plus-function elements: (1) "means responsive to a certain character code," (2) "means for generating scan-line select counts," (3) "means for generating position counts," and (4) "means for [causing (1), (2), and (3) to] supply to said display device a selected character pattern." We need consider only the third means clause to negate Dirks as an anticipating reference.

The third means of Cole is defined as "means for generating position counts which occur successively during a scan along a scan-line through a character space." The yokes of Dirks do not meet the limitation of this means, since they do not function in substantially the same way as a position count generating means. n4 The yokes of Dirks function to scan the coil matrices, magnetically coupling the coils to secondary windings. As the yokes move from position to position, stepping across the coil matrices, they act as a switch completing successive circuits and thereby form a series of on or off dots across a character space. The yokes do not keep track of the number of any counts. In fact no counts occur in Dirks. Most importantly, the yokes do not generate [*13] position counts as specifically required in claim 1. That the position of the yokes corresponds to

the position of the beam across a character space is irrelevant. The claim does not encompass all means for tracking the horizontal position of the beam across a character space. n5

n4 Contrary to the dissent, a different result would not follow from application of the doctrine of equivalents under *Tate Eng'g Inc. v. United States*, 477 F.2d 1336, 1342, 201 Ct. Cl. 711, 175 USPQ 115, 119 (1973), which requires *inter alia* that such equivalent element "must function in substantially the same way to produce substantially the same result." The yokes of Dirks do not meet that test.

n5 The dissent's reliance on the lack of precise implementation disclosed in the Cole specification for each element of the system is misdirected as a reason for finding anticipation. The dissent appears to endorse the district court's view that RCA has patented "a system concept" which produces an end result. It is hornbook law that abstractions, i.e., concepts, are not patentable subject matter. Under this view of the patent, with which we do not agree, the claims would be invalid under 35 U.S.C. § 101 or § 112.

Anticipation is determined by comparison of the reference with the claims. The claims here define the invention in terms of several specific "means-plus-function" elements. The limitations which must be met by an anticipatory reference are those set forth in each statement of function. *In re Mott*, 557 F.2d 266, 269, 194 USPQ 305, 307 (CCPA 1977). Such a limitation cannot be met by an element in a reference that performs a different function, even though it may be part of a device embodying the same general overall concept.

[**14]

Moreover, it is apparent that the position count means provides an *input* to the fourth means of claim 1. n6 In contrast, the yokes of Dirks serve to couple the output of the coil matrices to secondary windings, inducing a voltage which is applied to the amplifier, thus creating a dot signal to the CRT. The yokes thus effectively serve as a selective *output* of the coil matrices as part of the Dirks' character generator. n7

n6 The fourth means of claim 1 (which corresponds to the digital-to-video generator 32 in the Cole specification) supplies a "selected char-

acter pattern" to the display device in response to signals generated by each of the first three means.

n7 The dissent incorrectly attributes to RCA's expert certain "testimony" referring to the yokes as an "input." The quotation is actually a statement by opposing counsel "roughly" summarizing the witness's testimony on a previous day.

With regard to this last distinction, appellees contend that the position count [*1446] means claimed [*15] in Cole contains no limitation as an "input." However, as the specification makes clear, n8 Cole's position count means could only function as an input; Cole's invention would not operate, nor would it make sense for one to attempt to operate it, with the position count means functioning as a selective output in the manner disclosed by Dirks. We thus find no anticipation of claim 1.

n8 Column 11, lines 44-46: "The five position counts are fed individually and in sequence to the input terminals 50 through 54 [of digital-to-video generator 32]."

Turning to claim 2, again Dirks fails to disclose all elements of the claim. Specifically, Dirks does not disclose any type of digital generating means as required by the limitation "generating means . . . for *digitally generating* a video signal." (Emphasis added.) While the Dirks system produces a digital video signal (i.e., a signal that is either "on" or "off") for transmission to a TV raster scan display device, that signal is not *digitally generated* [*16] (i.e., produced by digital components). Resort to the specification of Cole confirms the above interpretation. The words "digitally generating" means the generator must be digital, not merely that the generator produces digital signals.

The digital-to-video generator of the Cole device includes a digital diode matrix decoder and a digital circuit array of three-input AND gates. In contrast, Dirks utilizes a crossing field system consisting of windings on inductively excitable bodies, the windings of each body being differently connected according to the corresponding figure to be represented. While the Dirks system produces a digital output signal, it does so in an analog fashion. Dirks has no digital generator, an element which is necessary to make the reference an anticipation.

Since claim 3 of the Cole patent is dependent upon claim 2, which is not anticipated, claim 3 cannot be anticipated.

HLA asks us to hold that the Cole claims, if not anticipated by Dirks, would have been obvious from Dirks. This assertion of obviousness from Dirks, admittedly not developed below as a separate issue from anticipation, is set forth here merely as a conclusory statement to its anticipation [*17] argument. HLA fails to point to anything in the record, either evidence or argument, directed to the issue of obviousness of the Cole invention over Dirks alone. Given the failure of HLA to even argue this issue in its post-trial brief, the district court cannot be faulted for failing to apply the *Graham v. John Deere Co.*, 383 U.S. 1, 17, 86 S. Ct. 684, 15 L. Ed. 2d 545, 148 USPQ 459, 467 (1966), analysis to Dirks alone. Contrary to the view of the dissent, HLA is not entitled to a remand to prosecute its attack on the patent piecemeal.

Obviousness from Dirks would follow, ipso facto, if Dirks anticipates. *In re Kalm*, 378 F.2d 959, 962, 54 C.C.P.A. 1466, 154 USPQ 10, 12 (1967), (anticipation stated as being the "epitome of obviousness"). Apart from that basis, which we reject, the obviousness from Dirks is not a conclusion to which we are inescapably led. The change from rotating magnetic splines (the yokes of Dirks) to a means for generating position counts (claimed in Cole) is not a mere substitution of a digital for an analog component.

In light of the above, we conclude that HLA has failed to sustain its burden of proving that the Dirks reference renders the Cole [*18] invention obvious. n9

n9 In a brief footnote, the trial court did rule that the subject invention, if not anticipated by Dirks, would have been obvious from Dirks and other prior art references showing "deflection waveforms." Since the type of waveform is not a limitation in the claims, this conclusion is in error.

IV

In resolving the issue concerning obviousness under 35 U.S.C. § 103, the district court primarily focused on three prior art patents: Evans et al., U.S. Patent No. 3,017,625; Jones et al., U.S. Patent No. 2,987,715; and Gordon et al., U.S. Patent [*1447] No. 2,920,312. HLA argues in this connection that these references are sufficient in themselves to show obviousness and that Dirks adds any additional necessary teachings.

Evans discloses a system in which a monoscope character generator translates digital character codes to video signals for a standard television monitor. A monoscope is an analog translator, commonly used in the 1950's, which translates a character code into a pulse

[**19] train with pulses of varying duration. The pulse train can be supplied to the CRT of a television, for example, to generate characters in sequential locations.

In the Evans system, digital timing circuits are provided for producing row counts and column counts which reflect the position of the scanning beam on the television screen. The counts are used to access a memory storing the digital character codes to be displayed. The character codes are supplied from the memory to the monoscope translator, and then to the television, without intermediate storage, in synchronism with the scanning of the television beam.

n10 Intermediate storage, i.e. the storage of translated video bits, though undesirable from a memory standpoint, was required in prior analog type character generators due to the high speed of video. The elimination of intermediate storage allows the Evans system, like the Cole system, to operate "on the fly."

The Jones and Gordon patents disclose digital dot matrix character generators [**20] for use in displaying characters on CRT's with a mini raster scan pattern. In a mini raster scan system, a message is written on the television screen one complete character at a time. Each character code is translated as it is received from the source into appropriate CRT beam intensity and positioning control signals. The character generator circuitry generates on/off signals corresponding to a pattern of dots forming the character, while the CRT beam traces horizontally through each character completely, one slice at a time, before going on to the next character.

Both the Jones and Gordon patents discuss the advantages of their dot matrix character generators over monoscopes. However, as their systems do not convert the character shape information to a full line scan sequence format, special deflection circuitry is required to control the position of the CRT beam. Thus, unlike Evans and Cole, the Jones and Gordon systems are incompatible with unmodified standard television sets.

The district court summarized the differences between the Cole invention and the Evans, Jones, and Gordon references as follows:

Cole, like Evans, translates digitally coded information [**21] for display, without intermediate storage, in a TV raster scan pattern, but it accomplishes the translation with a digital character generator, rather than a monoscope . . . Jones

and Gordon teach digital character generators much like that . . . of Cole. They do so, however, in the context of mini raster scan systems which present character-at-a-time patterns and they do not confront the problem of converting the character shape information to full scan line sequence.

The district court set the level of ordinary skill in the art as that of a "graduate engineer . . . with substantial research and development experience in the display field."

Having properly evaluated the indicia of the test set forth in *Graham v. John Deere Co.*, 383 U.S. at 17, 148 USPQ at 467, the district court concluded that it would not have been obvious to one of ordinary skill in the art to combine the "on the fly," full line character generator aspects of Evans with the digital character generator aspects of either Jones or Gordon to form the Cole invention.

Judge Stapleton stated:

While with the benefit of hindsight there appears to be no reason why the concepts of Gordon and Jones [**22] could not be used together with those of Evans, I find no suggestion in any of these references, [*1448] or anywhere else in the prior art, that they could or should be so used.

Judge Stapleton found the evidence presented insufficient to suggest that an artisan of ordinary skill at the time the invention was made would have perceived the feasibility of substituting a digital character generator for the monoscope in Evans, particularly in view of various differences in timing and circuitry between the Evans system and the Jones and Gordon systems.

Judge Stapleton also based his conclusion of non-obviousness on various secondary considerations present in the case, including the failure by others "to see what Cole . . . saw," and the commercial acquiescence of competitors, evidenced by RCA's extensive licensing of the invention.

We find no error in the district court's thorough and sound analysis following the tenets set forth in *Graham v. John Deere*. The only error of the court was in its failure to start with a presumption that the patent was valid, an error in HLA's favor.

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221 U.S.P.Q. (BNA) 385

As a final matter, HLA attempts to fault the district court for failing to consider [**23] Dirks in the above analysis. Particularly, appellees assert that Dirks provides "an express suggestion of using a digital character generator in a TV-raster scan display." At oral argument counsel for HLA admitted that Dirks was not asserted in this manner before the district court. Moreover, in view of our conclusion that Dirks discloses no digital generator, this argument is rejected.

V

For the foregoing reasons, we hold that the Cole patent has not been proved invalid. We, therefore, need not rule on the cross-appeal by Lear Siegler for return of royalties, since the issue is rendered moot under our decision.

The decision of the district court holding U.S. Patent No. 3,345,458 invalid for anticipation (or obviousness) in view of Dirks is therefore *reversed*, and the holding that the patent was not otherwise proved invalid for obviousness is *affirmed*. The case is *remanded* for further proceedings consistent with this opinion.

Appeal No. 83-782: REVERSED-IN-PART,
AFFIRMED-IN-PART, AND REMANDED

Appeal No. 83-827: DISMISSED AS MOOT

DISSENTBY:

KASHIWA

DISSENT:

KASHIWA, Circuit Judge, dissenting.

I respectfully dissent.

The majority reversed the district court's holding [**24] on anticipation and affirmed the district court's holding regarding nonobviousness. I disagree with the majority on both issues.

Anticipation

On the question of anticipation, the district court stated:

The Dirks system * * * is the Cole system implemented in 1940's digital technology, and, since the Cole claims are drawn to cover all digital systems generically, as opposed to a new implementation, they are anticipated by these foreign Dirks' patents. [558 F. Supp. at 945, 217 USPQ at 426.]

* * *

Thus, while the claims in suit must be read in the context of the specifications, they may not be read as limited to the implementation which they disclose. [558 F. Supp. at 945, 217 USPQ at 426.]

* * *

The Cole invention was not a specific device; it was a system concept for direct production of digital video bits from coded data and was operable when appropriately implemented by those skilled in the art * * *. The Dirks patents disclosed the same concept of converting coded data directly into pulse trains representing the appropriate characters, timed and arranged by character slices for display in a television type raster scan pattern. Like Cole, the Dirks [**25] concept was operable when properly implemented [*1449] by those skilled in the art. [558 F. Supp. at 950, 217 USPQ at 429.]

The issue of anticipation, under 35 U.S.C. § 102, is an issue of fact which is reviewable on appeal under the "clearly erroneous" standard of Rule 52(a), Fed. R. Civ. P. *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 789 (Fed. Cir. 1983). Thus, a reversal can be predicated only upon a "definite and firm conviction that a mistake has been committed." *United States v. United States Gypsum Co.*, 333 U.S. 364, 395, 68 S. Ct. 525, 92 L. Ed. 746 (1948). I believe the district court's holding on anticipation is completely supported by the record and by the extensive and detailed findings in its opinion.

As found by the district court, the Cole specification disclosed a system for computer generated digital data and did not disclose any specific structure for implementing the system. The Cole specification disclosed the system solely in terms of the functions to be performed. Thus, I disagree with the majority's holding that the district court erroneously equated the yokes of Dirks to the position counts means of Cole. [**26]

The district court's finding that Cole's position counts means was anticipated by Dirks is supported by the evidence. Since Cole's drawings disclosed the invention in functional block diagrams and his specification was neither explicit nor limited as to the contents of these blocks, the position counts means and the yokes were equivalents of one another. In *Tate Engineering, Inc. v. United States*, 477 F.2d 1336, 1342, 175 USPQ 115, 119 (1973), the Court of Claims stated: "To antici-

pate, a prior art reference must disclose each and every element of a claimed combination, *or its equivalents*, and the element must function in substantially the same way to produce substantially the same result." (Emphasis added.) Since the components of the Dirks system are of a 1940's vintage and those of the Cole system are *not specified*, the elemental blocks corresponding to the claimed elements in Cole are equivalents of the components of Dirks.

The majority's reliance on *Kalman, supra*, is without merit because in that case equivalency was not at issue. In the present case, equivalency is a major consideration which was raised at trial and in this appeal and it must be dealt with [**27] in this appeal. Otherwise, it would be erroneous and contrary to *Tate Engineering*. Since *Kalman* did not overrule *Tate Engineering*, *Tate Engineering* must be followed unless overruled en banc. *Tate Engineering* was a per curiam opinion by seven judges of the then United States Court of Claims, six of whom are still active on this court, including the writer of this dissent. Majority's summary overruling of *Tate Engineering* is contrary to this court's basic rules of decision making as adopted in *South Corp. v. United States*, 690 F.2d 1368, 215 USPQ 657 (Fed. Cir. 1982). n1 Similarly, majority's reliance on *In re Mott*, 557 F.2d 266, 194 USPQ 305 (CCPA 1977), is inapposite since the anticipatory reference, Dirks, discloses a structure, the yokes, that is capable of performing the functional limitation claimed in Cole.

n1 The holdings of the U.S. Court of Claims and of the U.S. Court of Customs and Patent Appeals ("CCPA") were adopted as precedent of this court. *South Corp.*, 690 F.2d at 1370, 215 USPQ at 658.

It is interesting to note that both the Federal Circuit and the CCPA had considered the issue of strict identity between an invention and anticipatory prior art. This issue is related, if not the same, as the equivalency issue enunciated in *Tate Engineering*. See *In re Smith*, 714 F.2d 1127, 1137 n. 13, 218 USPQ 976, 985 n. 13 (Fed. Cir. 1983); *In re Foster*, 343 F.2d 980, 52 C.C.P.A. 1808, 145 USPQ 166 (1965), *cert. denied*, 383 U.S. 966, 86 S. Ct. 1270, 16 L. Ed. 2d 307 (1966). See generally 1 D. Dunner, J. Gambrell, M. Adelman & C. Lipsey, *PATENT LAW PERSPECTIVES* 2-30 (2d ed. 1984).

[**28]

The district court's anticipation finding is also buttressed by the fact that the two systems are functionally identical. Both systems generate dot-position counts

during a scan of the beam through a character space, and apply them to the column elements of the translator matrix. In Cole, they are generated by unspecified components [**1450] in a timing and control unit and applied to column conductors 55 to 59 of the digital-to-video generator. In Dirks, dot-position counts are generated by yokes 71<0> to 71<9> and applied to the column cores such as cores 0 to 9 in matrix 50. Both systems count off positions at the respective matrix columns and cause a pulse or no-pulse to be applied serially to the CRT as the CRT beam scans the successive dot positions across the character space. In the Dirks system, the position of each yoke 71 tracks, and indicates the count of, the dot position of the scan, and performs the same sequential energization function as the Cole position counts. In this regard, the district court found:

The magnetic yokes 71<0> to 71<9> all move in unison, to scan the respective matrices 50 to 59, the successive dot positions of each matrix being [**29] scanned as the beam scans across a character space on the screen.

* * *

As the yoke 71<0> then scans the matrix rows 50<0> to 50<9>, in synchronism with the beam scan of positions 0 to 9 across a character space, with switch 46 in its leftmost position, the top slice of the "0" will appear as bright dots at positions 3, 4, 5 and 6 across the character space. [558 F. Supp. at 947, 217 USPQ at 427.]

The district court's finding is further supported by evidence in the record. For example, Mr. Seligsohn, the RCA patent attorney who prepared most of the Cole claims and participated in the licensing of the Cole patent, testified that the term "position counts" merely signifies that the video signal must be a serial string of on/off pulses for the successive positions across a character space. This capability is clearly present in both the Dirks and Cole systems. In this regard, Mr. Seligsohn testified:

It is my understanding that if you are going to produce a video signal for use on a television raster scan where * * * there is an electron beam, a single electron beam essentially, a one point that is moving, that you must apply a serial signal to that * * * [**30] because the beam has to be

turned on and off at the proper point when that electron beam is at that point.

So now you are suggesting that somehow you can get that without position counts, which are the serial on and off positions.

Now, I don't see that you can do that
* * * I say that if you are going to do it this way, then you have got to have position pulses in a serial form at the output.

I next disagree with the majority that Dirks cannot be an anticipatory reference since the yokes served as outputs of the matrices and not as inputs as required by Cole's claim 1. In essence, the majority believes that the position counts means must be an input to a character generator. This configuration, however, is not supported by the claims of Cole. In the Cole claims, there is neither a recitation of a character generator nor an indication of the exact relationship of position counts vis-a-vis the inputs of a character generator. Cole's claim 1 recites only (in element 4) that the position counts contribute to the *supply* of a video signal to the display device. More important, however, is that the configuration disclosed in Dirks amply supports the district court's [**31] finding that the yokes are inputs. Each matrix's output signal to the screen is the result of the combined action of three signals -- the character code, the scan-line count, and the position count. In operation, the primary windings of each matrix are energized by the character code and the scan-line count signals, respectively. After the closure of the matrix's core by the position count signal of a yoke 71, the secondary winding of the matrix produces the output signal. Thus, yoke 71 clearly serves as an input. Professor Ward, an expert witness in behalf of RCA, testified that "whether the screen [at] each point is bright or not bright, is dependent upon three *inputs* in the Dirks system, one being the character input to one of the matrices, the other being the scan-line input, and the other being the position of the yoke [*i.e.*, position [*145] count] along the matrix." (Emphasis added.)

Last, the majority held that Dirks failed to disclose digitally generated signals as required by Cole's claim 2. The district court, however, stated:

RCA and its expert read the word "digital" more narrowly than did artisans of ordinary skill in the art in the early [**32] 60's.

The character generator of the Dirk system can produce only on/off signals,

for each successive pulse position of the video pulse train. There is no value significance to any voltage derived from a Dirks core matrix until the voltage reaches a level to produce a pulse at the output of amplifier 72 in Figure 2a. Anything above that level produces an output pulse; anything below it does not. * * *

This is purely digital operation. [558 F. Supp. at 949, 217 USPQ at 428-29.]

I believe the district court's finding in relation to anticipation was not clearly erroneous.

Obviousness

Assuming *arguendo* that the district court's ruling on anticipation was incorrect, I would vacate the obviousness holding and remand to the district court in light of the fact that the district court's determination on this issue was flawed. From the district court's opinion, it is difficult to discern whether the district judge considered the Dirks patent in his obviousness determination. With the exception of two footnote references to the Dirks patent, the district judge's obviousness determination was based on an analysis of the Evans, Jones, and Gordon patents.

Contrary [**33] to the majority's statement that there was "no error in the district court's thorough and sound analysis following the tenets set forth in *Graham* * * *", I believe that the district court's factfinding regarding the "differences" criterion set forth in *Graham* was clearly erroneous.

Where, as here, the obviousness of an invention is at issue, the Supreme Court has clearly mandated factfindings on each of the three factors stated in *Graham*. A district court must make such factfinding "in such detail and exactness as the nature of the case permits * * * on which the ultimate conclusion * * * can rationally be predicated." *Kelley v. Everglades Drainage District*, 319 U.S. 415, 420, 63 S. Ct. 1141, 87 L. Ed. 1485 (1943); see *United States v. Morow*, 182 F.2d 986 (D.C. Cir. 1950) (findings were not sufficiently comprehensive to warrant affirming the district court's judgment). These factfindings are necessary "to disclose to the reviewing court the steps by which the trial court reached its ultimate conclusion * * *." *Denofre v. Transportation Insurance Rating Bureau*, 532 F.2d 43, 45 (7th Cir. 1976). See generally *Golf City, Inc. v. Wilson Sporting Goods Co.* [**34], 555 F.2d 426 (7th Cir. 1977). Generally, a reversal and a remand are warranted when the district court's factfindings are ambiguous, contradictory, incomplete, or insufficient to establish a satisfactory basis for a decision.

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The E. A. Packer, 140 U.S. 360, 11 S. Ct. 794, 35 L. Ed. 453 (1891). In particular, it is reversible error when factfindings fail to provide an appellate court with a clear understanding of the basis of the district court's obviousness determination. See *Golf City*, 555 F.2d at 434; *United Shoe Machinery Corp. v. Kamborian*, 160 F.2d 461, 465, 73 USPQ 1, 5 (1st Cir. 1947).

Although the district court recognized that appellees relied on Dirks as well as the other references in their obviousness argument, it failed to take Dirks into consideration in its analysis. n2 Instead, the district court focused on the Evans, Jones and Gordon patents, and only mentioned Dirks in two footnotes. In his discussion captioned "Comparison of Cole With the Prior Art And The Obviousness," 558 F. Supp. at 952, 217 USPQ at 431, the district judge stated:

[*1452] The primary Section 103 issue n15 presented by the parties is whether it would have been obvious [*35] to one of ordinary skill in the art in October of 1963 * * * to combine Jones or Gordon with Evans in such a way as to produce the concept claimed in Cole. While the fact that the Examiner apparently did not consider a prior art patent disclosing a digital character generator deprives the Cole patent of its presumption of validity, I nevertheless conclude that Cole is not obvious based on Evans in light of Jones or Gordon.

n15 As explained in an earlier footnote, I conclude that Cole, if not anticipated by Dirks, is obvious from Dirks in light of Brown et al. and others. See n. 6, supra. [558 F. Supp. at 952, 217 USPQ at 431.]

Footnote 6 merely states:

n6 The use of both sawtooth and staircase (or stepping) waveforms for vertical and horizontal deflection in CRTs was common prior to 1960, as evidenced by the Brown and Gordon patents. * * * It was a matter of designers' choice. Thus, if Dirks is distinguishable on the basis of its stepping in a vertical direction, Cole was nevertheless obvious from the prior art and invalid under 35 U.S.C. § 103. [558 F. Supp. at 948, 217 USPQ at 428.]

This was the extent of the district judge's obviousness analysis that [*36] included a mention of Dirks.

n2 The district judge stated:

In support of their obviousness argument, HLA rely not only on Dirks but also upon Jones, et al., Gordon, et al. and Evans, et al. [Footnotes omitted.] [558 F. Supp. at 951, 217 USPQ at 430]

The excerpts indicate that it is not clear whether the district judge relied on Dirks in his obviousness analysis. n3 While the text speaks of combining Evans, Jones and Gordon, footnote 15 states that Cole was obvious in light of Dirks and Brown. The district judge seemed to have either ignored Dirks in the obviousness analysis or believed that an anticipatory reference such as Dirks need not or could not be included in such analysis. The factfindings fail to disclose to us the steps by which the district judge reached his obviousness conclusion. See *Kelley, supra*; *Morow, supra*. It is confusing as to whether he relied on or ignored Dirks in the factfindings regarding the "differences" between Cole and the prior art references. See [*37] *Packer, supra*. Failure to explicitly include Dirks in factfindings regarding the "differences" so as to provide an appellate court with a clear understanding of the basis of the district court's obviousness determination is reversible error. See *Golf City, supra*; *United Shoe, supra*.

n3 Contrary to majority's belief that appellees alone contributed to the district court's confusion, RCA also contributed to that confusion. In a footnote on page 39 of its Post-Trial Brief, RCA stated:

As noted earlier, the inoperativeness of the foreign Dirks patents removes them from possible consideration as anticipatory references, * * * and from consideration as to the obviousness of the Cole patent * * *.

In addition, RCA, on page 18 of the same Post-Trial Brief, acknowledged HLA's arguments

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at trial regarding the obviousness of the Cole invention in light of Dirks.

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